Aura Validation Experiment
Science Flight #8 Summary Report
November 12, 2004

Flight Objective:

Provide multiple vertical profiles of MLS limb observational points in a latitudinal profile from Louisiana to Iowa. MLS sampling points exactly located at waypoints.

Flight Summary:

The flight on Friday, 12 November, was arranged to coincide with an Aura track segment that extended from the southern end of the Texas-Louisiana border to the Oklahoma-Nebraska border. The Aura overpass occurred when the aircraft was near the north end of the track. The close track enabled us to plan for extensive vertical profiling in support of MLS retrieval validation. Both outbound and return tracks were along the line of MLS retrieval locations. Level sampling legs occurred at 37 kft, 53 kft, and 59 kft, respectively, with profiles between altitudes located over the MLS retrieval locations. A deep upward spiral was made at the northern end of the track, starting at 20 kft and extending to 57 kft. The skies were largely overcast with low-level clouds along the track.

Preliminary indications are that all instruments worked for most of the flight. Accordingly, we expect that this flight will result in valuable comparisons between MLS, TES, OMI, and the aircraft instruments.

Weather information is available in Figures 2-4.

Flight Profile (see Figure 1)

Takeoff: 11:06 CST
Landing: 15:21 CST
Duration: 4.3 hrs

Point 3: N31º 08', W93º 58'
Point 5: N32º 37', W94º 22'
Point 9: N35º 35', W95º 11'
Point 11: N37º 03', W95º 37'

Aircrew: Steve Feaster, Pilot, and Brian Barnett, Backseater

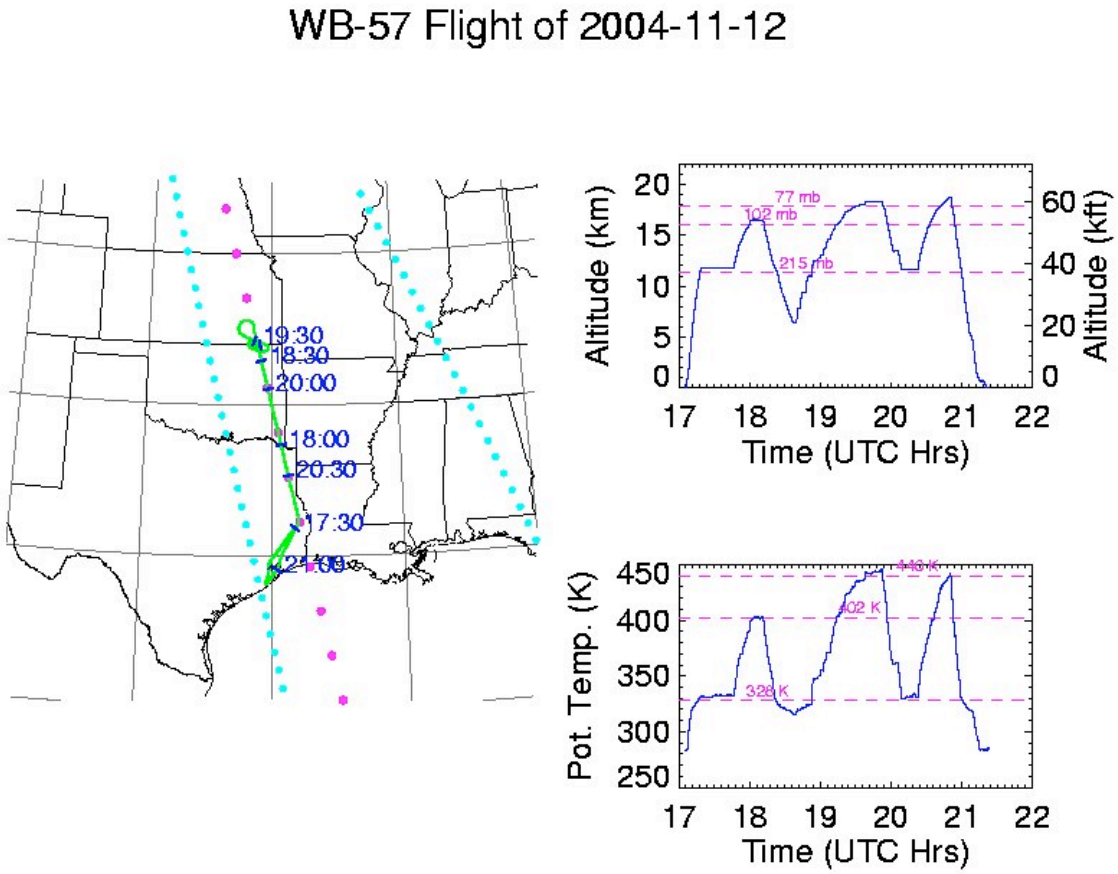

Figure 1 – Flight Profile

(Left) Map of WB-57F flight track (in green) with every half-hour marked. Aura nadir (faint cyan points) and MLS tracks (magenta points) are indicated.
(Upper Right) Plot of pressure altitude vs. time with the principal pressure levels of the flight marked.
(Lower Right) Plot of potential temperature vs. time with the principal theta levels of the flight marked.

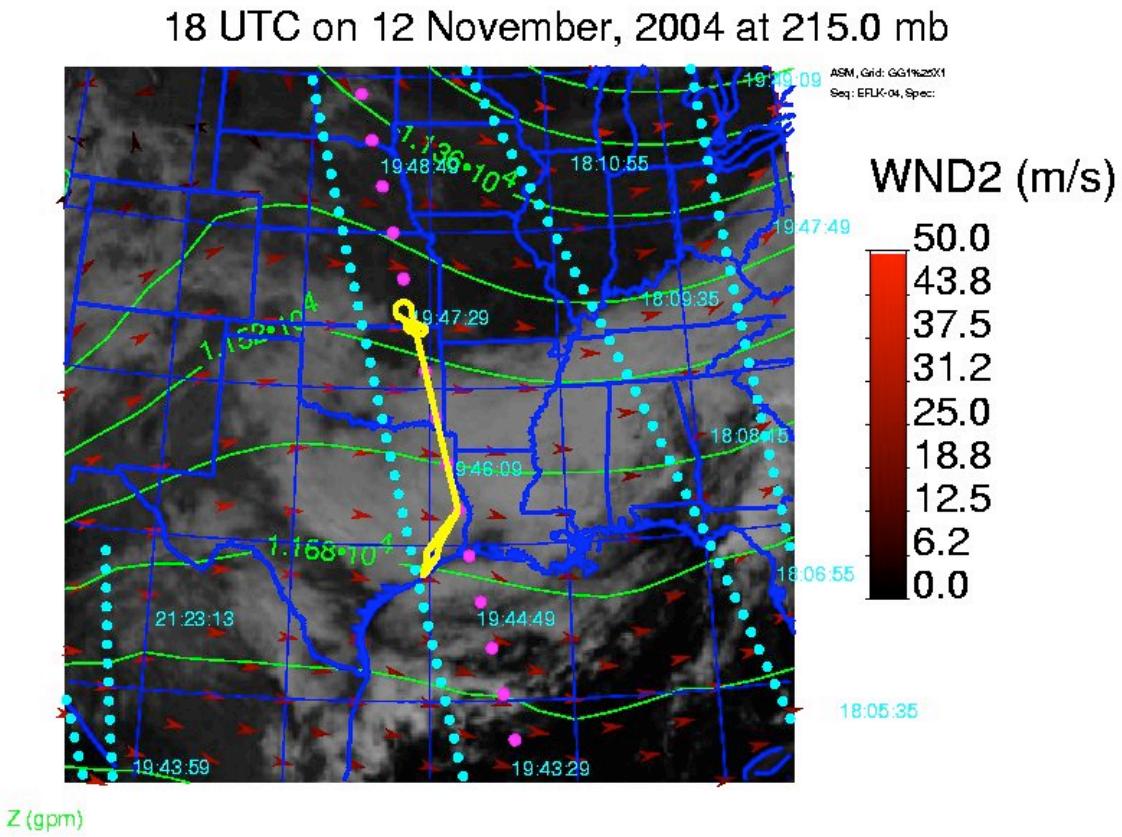

Figure 2 – GOES Visible Image

Flight track (yellow line) superimposed on meteorological fields. The grayscale image is the GOES-12 visible channel satellite image. The red arrows and green lines are the winds (WND2) and the geopotential heights (Z) at the principal pressure level at which the aircraft spent the most time. Values are from the GSFC GMAO assimilation analyses. The Aura nadir (cyan) and MLS tracks (magenta) are shown, with times along the ground track indicated.

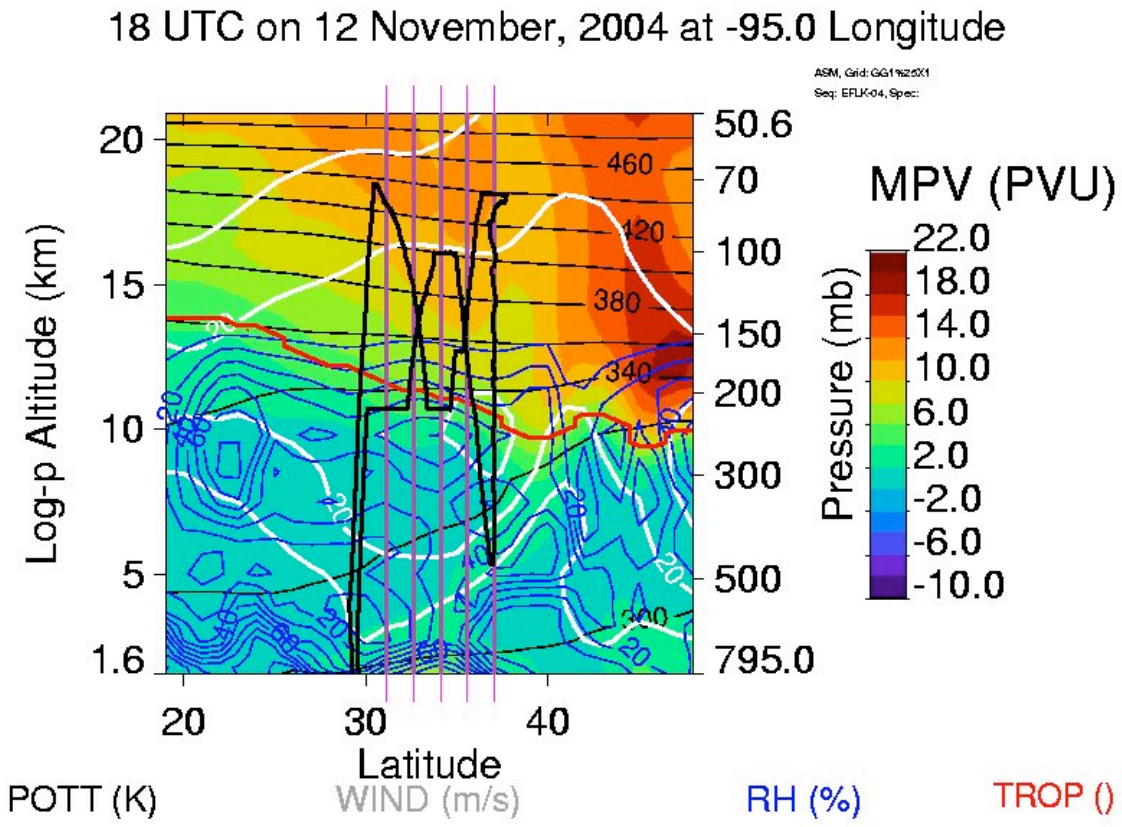

Figure 3 – Latitude Height Cross Section

Latitude-pressure cross-section of meteorological fields during the flight. The colored image represents modified potential vorticity (MPV); also shown are potential temperature (POTT) (thin black lines), wind speed (WIND) (white lines), relative humidity (RH) (blue lines), and the PV tropopause (TROP) (red line). The thick black lines mark the aircraft position and the vertical lines mark the positions of nearby MLS profiles.

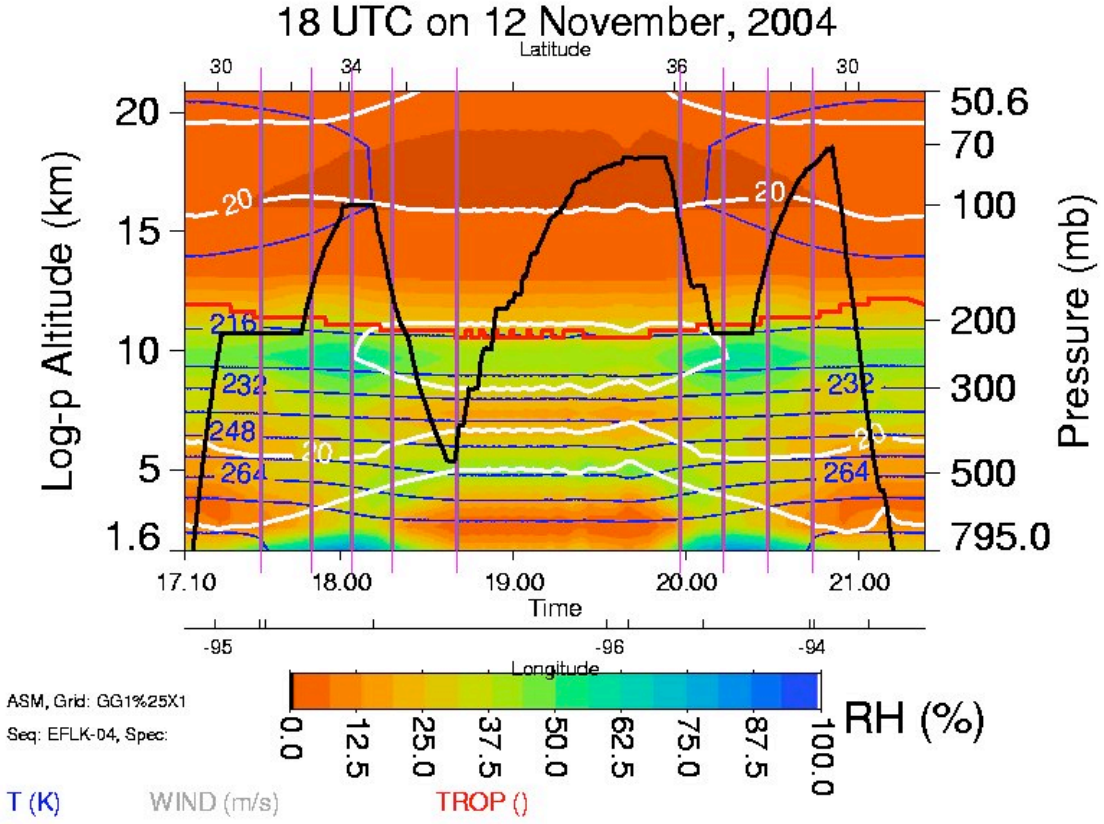

Figure 4 – Curtain Plot

Time-pressure "curtain" plot of meteorological vertical profiles along the flight track. The colored image represents relative humidity; also shown are temperature (T) (blue lines), wind speed (WIND) (white lines), and the PV tropopause (TROP) (red line). The thick black lines mark the aircraft position and the vertical lines mark the positions of nearby MLS profiles.